A novel solution for the patient with knee ankylosing spondylitis: a case report

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ABSTRACT

Background: Knee ankylosis is a joint condition that causes functional limitation that becomes more severe when accompanied by pain. Arthroplasty is a complex and intricate reconstruction procedure that is more challenging when there is a structural limitation that requires a technique modification. In this report, we presented a rare case of a young patient with knee ankylosis and flexion contracture treated with arthroplasty.

Case Presentation: A 20-year-old young woman came to the hospital with stiffness in her left knee, inability to sit well and crouch, and difficulty getting up from sitting. Based on the physical examination and X-ray of the left knee, the patient showed bone ankylosis on the femorotibial joint with a 10° flexion, which confirmed knee ankylosis. Arthroplasty was performed with a parapatellar medial approach. After eight months of supervision, the patient was able to perform an active flexion within 105° and a full extension on the left knee. In our patient, arthroplasty brought a satisfying functional outcome and pain reduction, which was also supported by previous studies with the same procedure on ankylosis patients.

Conclusion: Arthroplasty can be considered the main therapy option for joint deformities due to its more satisfying outcomes.

Keywords: ankylosing spondylitis, arthroplasty, knee ankylosis.

INTRODUCTION

Knee ankylosis is a joint fusion that causes functional limitation that becomes more severe when accompanied by pain. According to one study about the epidemiology of ankylosing, Asia has a prevalence of ankylosing disease of about 0.11%, specifically in Shanghai. Knee arthrodesis, one of the treatment options, is indicated for patients with the condition to ease the pain, although the functional limitation will remain. Meanwhile, arthroplasty is another option that involves replacing all parts of the joint. The procedure is performed in cases of degenerative processes and sequelae of inflammatory diseases and has been rapidly growing in orthopedic practice. Arthroplasty is a complex and intricate procedure and is far more challenging when there is a structural limitation that requires technique modification. Another option of treatment was conservative treatment without any further intervention. In this case, we presented a rare case of a young patient with knee ankylosis and flexion contracture treated with arthroplasty. This research is aimed to provide information about the rare case of total knee outcome in patients with ankylosing spondylitis.

CASE PRESENTATION

A 20-year-old young woman came to the hospital with stiffness in her left knee that had occurred for two years. She was unable to sit well, had difficulty getting up from sitting, and could not crouch. The patient was diagnosed with rheumatoid arthritis (RA) in 2016 with joint pain, as the earliest complaint was not taking any medicine related to RA. Two years after the onset of the disease, the patient also complained about swelling and limitation in joint movement. There was no history of trauma despite the history of physiotherapy treatment for two years since 2019. The patient could not walk and required a wheelchair to move. Then, she used a walker to walk for a few months before being diagnosed with systemic lupus erythematosus (SLE). After that, she underwent physiotherapy for two years in 2019.

There was no history of gastrointestinal, skin, or urinary tract infections. The patient denied any family history of autoimmune disease. The physical examination upon admission revealed a 0° of active movement and a 10° flexion range on the left knee joint in passive movement with an empty sensation. A swelling was visible on the left knee, and muscle atrophy was found on the bottom of the left leg.

No laboratory examination was performed. Preoperative anteroposterior and lateral X-ray examination showed bone ankylosis on the femorotibial joint with a 10° flexion angle. On X-ray, the joint gap seemed to disappear (Figure 1).

The final diagnoses were knee joint ankylosis and SLE. These were based on the results of physical examination: active and passive movements on the knee joint, Varus and Valgus stress test, muscle atrophy evaluation of hamstring and quadriceps muscle, and X-ray of the knee in anteroposterior and lateral views.

Surgery was performed with an incision through the middle line with a parapatellar medial approach (Figure 2), as well as bone and soft tissue excision. Ankylosis was loosened through careful
CASE REPORT

Figure 1. Preoperative anteroposterior X-ray examination on the left knee. There was a bone fusion on the femorotibial joint, and the joint gap seemed to disappear.

Figure 2. The arthroplasty on the left knee of the 20-year-old woman. An incision on the middle line with a parapatellar medial approach.

Figure 3. Ankylosis release on the left knee of the 20-year-old woman. The outer side of the joint was removed, thus loosening the joint fusion.

Figure 4. Post-operative X-ray was taken after surgery. The photo showed the final arthroplasty result after the release of the outer side of the joint to loosen the joint fusion.

A knee with ankylosis is characterized by an absence of or severely reduced range of movement before surgery and usually without local pain. Several investigations have provided evidence regarding the result of TKA on knees with a less than 50° preoperative flexion angle and spontaneous bone ankylosis. Some research even used small numbers of samples and did not accurately compare the stiffness and knee ankylosis, nor did they identify all possible complications. Among those studies, one described a young patient with severe deformity on bodily joints, who not only suffered physically but also mentally.

Various methods of TKA in patients with severe flexion knee ankylosis have been discovered. In two-phased arthroplasty, for instance, the first phase aims to release bone fusion and soft tissue, followed by skeletal traction of the distal tibia to correct the flexion deformity as much as possible, after which the TKA can be conducted. In one study, this type of TKA gave rise to better movement compared to before the arthroplasty. This finding was critical, as the walking and sitting accomplishments determine the patient's quality of life. Other researchers who encountered severe joint limitations also performed arthroplasty on young patients, as elaborated by Schurman et al. in a 24-year-old patient with knee ankylosis. However, further revision for young patients is required in the future.

The aforementioned cases in which the same procedure was preferred convey a message that, eventually, an understanding of the complications that frequently occur in this kind of case is a must. Skin necrosis and delayed wound healing are some of the most common complications. Meanwhile, damage to the neurovascular structure is a severe complication and might occur during surgery when releasing the soft tissue on the pelvis or knees or after the surgery due to excessive stretching. It is recommended not to correct the damage immediately but rather to restore the deformity progressively by using plaster wedging to prevent other complications such as gangrene and foot drop.

The favorable outcome of arthroplasty was also illustrated by Rajgopal et al. in their case series, with a total of 84 knees on 53 patients having severe joint manipulation after the release of the outer side of the joint (Figure 3), thus achieving a satisfactory arthroplasty (Figure 4).

Three days following the surgery, the patient was able to stand up. Five days after the surgery, she was able to walk with a walker device and progressed to walking on her feet in the next three days.

After eight months of supervision, the patient could perform an active flexion within 105° and a full extension on the left knee more easily (Figure 5).

Varis and valgus stress test on the left knee joint yielded a negative result. We did not find any muscle atrophy. Moreover, the patient did not feel any pain and felt satisfied with the surgical functional outcome.

DISCUSSION

The fusion of joints spontaneously occurs in RA and ankylosing spondylitis. Subsequently, the soft tissue experiences contracture and atrophy, resulting in severe disability. Total knee arthroplasty (TKA) may become a solution; however, there have only been a few reports that explain the technique and indications in difficult circumstances, such as in this patient. The present study also reported a TKA in a patient with knee ankylosis.

Varis and valgus stress test on the left knee joint yielded a negative result. We did not find any muscle atrophy. Moreover, the patient did not feel any pain and felt satisfied with the surgical functional outcome.
limitations. Nine years following the surgery, they reported lesser pain and greatly improved quality of life. This concludes that improvement of severe limitation is possible through arthroplasty, despite a long time.

On the other hand, Kim et al., presented 16 knee ankylosis patients with a history of pyogenic or tuberculosis, yielding a satisfactory result with only two cases of post-operative infection. In other words, the possibility of post-surgical infection is still there, regardless of the proper techniques. Hasegawa et al. suggested that such infections could be prevented using antibiotics. They administered antibiotics to 14 patients during the TKA procedure. Eleven of them were clear of infection. The rest had recurrent infections, but possible reinfection was eliminated following management. Wherever preventative measures had been taken and the risk of infection had been minimized, it is a possibility the patients should be made aware of.

From the cases above, we can infer that despite the infection and other complications such as bleeding and urinary retention, the benefits, including movement improvement, reduced pain, better quality of life, and cost-beneficial, still outweigh the risks.

CONCLUSION

Joint deformities can be treated with osteotomy and soft tissue release, arthrodesis in an optimal position, and arthroplasty. Nevertheless, the result of arthroplasty is easier to predict and more satisfying compared to other therapy options. For that reason, we believe that this treatment should be considered the therapy of choice.

ETHICAL CONSIDERATIONS

Informed consent was legally written and given by the patient for publication purposes in regard to any associated information and images.

CONFICT OF INTEREST

The authors declare no conflict of interest.

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AUTHOR CONTRIBUTIONS

All authors contributed equally.

REFERENCES